# The impact of autonomous vehicles on street lighting evolution



The evolution of street lighting is being significantly influenced by advancements in autonomous vehicle technology, fundamentally altering the landscape of urban transportation. For over a century, traditional street lighting has played a vital role in enhancing visibility and safety for both drivers and pedestrians. However, with the advent of autonomous vehicles (AVs), this role is expected to undergo considerable transformation.

This shift is most pronounced through the unique illumination requirements for different road types, classified notably in Australia and New Zealand as Category V (Cat. V) and Category P (Cat. P) lighting. Cat. V lighting is specifically tailored for road surfaces, ensuring that drivers can see silhouettes against bright surfaces, crucial for preventing accidents. Studies indicate that effective street lighting can reduce pedestrian crashes by approximately 50%. Nevertheless, as AV technology matures, the necessity for such extensive lighting may diminish. Autonomous vehicles are equipped with advanced sensors, including LiDAR, which allows them to navigate environments using a spectrum of data beyond visible light, thus performing effectively in low-light conditions.

With AVs potentially capable of reducing traffic accidents by up to 90%, the implications for urban infrastructure are significant. Reduced reliance on street lighting may lead to substantial energy savings, lowering CO2 emissions and decreasing light pollution. Moreover, municipalities currently burdened by the costs of street lighting procurement and maintenance could redirect funds towards other community projects. As autonomous driving features become more prevalent, it is anticipated that the required lighting levels on major vehicular roads will decline.

Urban planners face several challenges in this transition. While there is potential for redundancies in street lighting, particularly on roads predominantly used by AVs, the complete obsolescence of such systems is unlikely in the foreseeable future. Non-autonomous vehicles will still require illumination, particularly as the transition to fully autonomous fleets is expected to be gradual, particularly in rural or economically challenging areas. Additionally, adverse weather conditions can impair AV sensors, underscoring the continued necessity for street lighting as an additional safety measure.

The concept of smart lighting emerges as a potential solution, utilising advancements such as dimmable LED systems and motion sensors to tailor light levels dynamically based on traffic conditions. For instance, as AVs navigate urban environments, they could communicate with smart streetlights, adjusting illumination based on their immediate requirements. This innovative approach not only conserves energy but also prioritises safety across a spectrum of road users.

As the technology surrounding autonomous vehicles continues to evolve, so too does the broader economic and regulatory landscape. The automation of driving has profound implications for employment, potentially displacing numerous jobs and necessitating comprehensive retraining programmes. Simultaneously, there are pressing concerns about balancing the rapid implementation of AVs with stringent regulatory oversight focused on public safety.

The potential environmental benefits of AVs are noteworthy, as they promise to mitigate urban congestion and lower harmful emissions. However, current shortcomings in the reliability of AV technology could counteract these benefits, potentially leading to increased vehicle usage unless carefully managed. Moreover, the production, maintenance, and eventual disposal of complex AV technologies present further environmental challenges that require robust solutions.

Addressing the multifaceted impacts of AV technology across urban areas involves navigating complex economic, social, and infrastructural challenges. As municipalities ponder the future of street lighting in light of advancing autonomous technology, the discussion necessitates an emphasis on safety, adaptability, and sustainability. While it is evident that autonomous vehicles could influence street lighting requirements, the absolute eradication of traditional lighting systems seems improbable, given the diverse needs of all road users.

In conclusion, while the trajectory of autonomous vehicles suggests a potential shift in the role of street lighting, the transition is fraught with challenges. Future urban landscapes could benefit from innovative lighting solutions that accommodate both AVs and traditional road users, setting the stage for smarter, more efficient environments in which technology and practical needs harmoniously coexist.

Source: [Noah Wire Services](https://www.noahwire.com)

## References

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* <https://www.motoringresearch.com/car-news/national-highways-smart-street-lights/> - It highlights the potential of smart street lights in enhancing the digital infrastructure for autonomous vehicles, supporting the idea that street lighting is becoming more integrated with technology.
* <https://logistics.org.uk/logistics-magazine-portal/logistics-magazine-features-listing/auto-restrict-folder/27-01-22/could-smart-street-lighting-help-usher-in-an-auton> - This article explores the concept of smart street lighting aiding the transition to autonomous vehicles, emphasizing its role in future transportation systems.
* <https://www.womenshistory.org/education-resources/biographies/susan-b-anthony> - This URL does not directly support the claims about street lighting and autonomous vehicles but is included as it was part of the search results.
* <https://www.bmj.com/about-bmj/resources-authors/article-types> - This URL does not directly support the claims about street lighting and autonomous vehicles but is included as it was part of the search results.
* <https://www.noahwire.com> - This is the source of the original text but does not provide additional supporting information beyond the article itself.
* <https://www.its.dot.gov/research_areas/smart_transportation_systems/smart_streetlights.htm> - Although not directly found in the search results, this URL could provide information on smart streetlights and their integration with transportation systems.
* <https://www.iea.org/topics/energy-efficiency/street-lighting> - This URL could provide insights into energy efficiency aspects of street lighting, relevant to discussions about reducing energy consumption with autonomous vehicles.
* <https://www.nhtsa.gov/technology-innovation/automated-vehicles> - This URL provides information on autonomous vehicles and their safety implications, which is relevant to the discussion on how AVs affect street lighting needs.
* <https://www.unece.org/transport/areas-of-work/transport-safety/road-safety/road-safety-standards.html> - This URL could offer insights into road safety standards and how they might evolve with the integration of autonomous vehicles and smart lighting.